METHOD FOR MOTION CLASSIFICATION USING SWITCHING LINEAR DYNAMIC SYSTEM MODELS

ABSTRACT OF THE DISCLOSURE

Portions of an input measurement sequence are classified into a plurality of regimes by associating each of a plurality of dynamic models with one a switching state such that a model is selected when its associated switching state is true. In a Viterbi-based method, a state transition record is determined, based on the input sequence. A switching state sequence is determined by backtracking through the state transition record. Finally, portions of the input sequence are classified into different regimes, responsive to the switching state sequence. In a variational-based method, the switching state at a particular instance is also determined by a switching model. The dynamic model is then decoupled from the switching model. Parameters of the decoupled dynamic model are determined responsive to a switching state probability estimate. A state of the decoupled dynamic model corresponding to a measurement at the particular instance is estimated, responsive to the input sequence. Parameters of the decoupled switching model are then determined responsive to the dynamic state estimate. A probability is estimated for each possible switching state of the decoupled switching model. A switching state sequence is determined based on the estimated switching state probabilities. Finally, portions of the input sequence are classified into different regimes, responsive to the determined switching state sequence.